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By-Vickery, Tom Rusk; Brown, Bob Burton

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To investigate the use of measures of belief and systematic observations of classroom behavior to increase consistency between beliefs and teaching practices, 3 questions were posed: (1) Will teachers develop a more consistent body of beliefs when given empirical evidence of their logical inconsistency? (2) Will such teachers come to behave more or less in accordance with their professed beliefs? (3) Can measures of a teacher's beliefs be used to predict changes in behavior that occur when he is exposed to empirical evidence of his personal inconsistency? The Teacher Practices Inventory, the Personal Beliefs Inventory, and the Teacher Practices Observation Record were used to measure beliefs and behavior in terms of agreement or disagreement with John Dewey's philosophy of experimentalism; Rokeach's Dogmatism Scale was used to measure openness to change. Fifty-three teachers were tested and observed teaching both before and after an extended inservice program. Statistical analysis of the data provided negative answers to all three questions. A particular difficulty encountered in this research was the existence of white and Negro subgroups in the group of teachers tested. The Negro teachers in this rural area of South Florida, apparently anxious to avoid contact with white authority whenever possible, seemed particularly threatened by the white observers. (SG)

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# EMPIRICAL EVIDENCE AND PERSONAL CONSISTENCY

Tom Rusk Vickery
Assistant Professor
School of Education
Northwestern University

and

Bob Burton Brown
Associate Professor
College of Education
University of Florida

This research investigated the use of measures of belief and systematic observations of classroom behavior to increase the consistency between beliefs and teaching practice. This entailed answering three questions:

1. Will teachers who are presented empirical evidence of their logical inconsistency develop a more nearly consistent corpus of beliefs?

2. Will such teachers come to behave more or less in accordance with their professed beliefs?

3. Can measures of a teacher's beliefs be used to predict changes in teaching behavior that occur when he is exposed to empirical evidence of his personal inconsistency?

The *Teacher Practices Inventory* (TPI), the *Personal Beliefs Inventory* (PBI), and the *Teacher Practices Observation Record* (TPOR)[1] were used to measure beliefs and behavior in terms of agreement-disagreement with John Dewey's philosophy of experimentalism; Rokeach's *Dogmatism Scale* (D Scale)[2] was used to measure openness to change.

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[1]Bob Burton Brown, "The Relationship of Experimentalism to Classroom Practices" (unpublished Ph.D. dissertation, The University of Wisconsin, Madison, 1962).

[2]Milton Rokeach, *The Open and Closed Mind: Investigations into the Nature of Belief Systems and Personality Systems* (New York: Basic Books, Inc., 1960).

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Both before and after an extended in-service program each of 53 teachers completed the TPI, PBI, and D Scale and was observed teaching in his own classroom by at least one of eight observers using the TPOR. The in-service program used the averages of these pretest scores as the basis for a discussion of the relationship between specific beliefs and behaviors, and the teachers, using the TPOR, observed the teaching behavior of several members of the group by means of videotape.

An index of consistency was created by adjusting[3] the TPI, PBI, and TPOR scores to have a common range, and thus using PBI/TPI, TPOR'/PBI', and TPOR'/TPI' as ratios descriptive of individual and group inconsistency. The teachers were not urged to adopt any specific belief or behavior, but only to develop greater personal consistency regardless of their beliefs and behavior. In addition to the group discussion of the relation between specific beliefs and specific behaviors, in a private conference each teacher discussed his scores and his personal inconsistency with the consultant leading the in-service program. After the in-service program, the teachers again completed the TPI, PBI, and D Scale, and the same team of observers made observations using the TPOR.

*Statistical Analysis of the Data*

This research was originally proposed upon the assumption that a single population was being sampled. However, when the pretest scores on the TPI, PBI, and D Scale were compared with the scores of a sample of 320 teachers

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[3]The usual possible range of scores is 40 to 240 for the PBI and TPI and 0 to 186 for the TPOR. To equalize the ranges, the following corrections were made: PBI - 40 = PBI' and TPI - 40 = TPI'; TPOR x 1.075 = TPOR'. This gives the corrected scores a possible range of 0 to 200.

from five states reported by Vickery and Brown,[4] it was discovered that the present sample was significantly more dogmatic. Separating the scores of Negro and white teachers showed that the latter group was not significantly different from the national sample on the D Scale, but the Negro subgroup was. In addition, the Negro teachers were also significantly different from the white subgroup on the D Scale, TPI, and TPOR.

Table I summarizes this data. This finding necessitated the analysis of the data in terms of two subgroups instead of one. The white subgroup was composed of 14 teachers who had an average age of 40.5 years with a standard deviation of 15.3 years; the 39 Negro teachers had an average age of 37.0 years with a standard deviation of 10.2 years.

*Score changes.* The only significant score change for either subgroup was a decrease for the Negro teachers on the D Scale. Although all other changes were nonsignificant, comparisons of posttest means for the subgroups showed that the sggnificant pretest difference on the TPI had disappeared and that the statistical significance of the difference on the D Scale and the TPOR had increased to the .01 level of confidence. Tables II and III summarize this analysis.

The change in TPOR scores introduced a problem of observer reliability which limited the amount of useful information which a simple comparison of scores could give. To account for the change, five different multiple

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[4]Tom Rusk Vickery and Bob Burton Brown, "Descriptive Profiles of Beliefs of Teachers" (paper read at the Annual Meeting of the American Educational Research Association, New York, February 16, 1967).

TABLE I

COMPARISONS OF PRETEST MEAN SCORES OF SOUTH FLORIDA GROUPS AND NATIONAL SAMPLE

| | South Florida Sample (1) Total | (2) Negro | (3) White | Nat'l (4) Sample[a] | 1 & 4 | 2 & 4 | 3 & 4 | 2 & 3 |
|---|---|---|---|---|---|---|---|---|
| PBI Mean | 141.4 | 140.4 | 144.4 | 142.6 | -0.44 | -0.83 | 0.30 | -0.74 |
| S.D. | 17.5 | 15.6 | 22.4 | 18.1 | | | | |
| TPI Mean | 168.1 | 164.9 | 177.1 | 168.5 | -0.13 | -1.22 | 1.60 | -2.34[b] |
| S.D. | 18.2 | 16.8 | 19.5 | 21.5 | | | | |
| D Scale Mean | 145.7 | 140.4 | 160.4 | 158.4 | -3.53[c] | -3.45[c] | 0.34 | -2.17[b] |
| S.D. | 25.2 | 31.9 | 22.2 | 17.5 | | | | |
| TPOR Mean | | 79.2 | 96.4 | | | | | -2.17[b] |
| S.D. | | 25.8 | 24.6 | | | | | |

[a]The national sample data used here was taken from the research reported by Vickery and Brown, op. cit.

[b]$p < .05$

[c]$p < .01$

TABLE II

t-VALUES FOR PAIRED DIFFERENCES IN PRETEST AND POSTTEST MEANS FOR THE SUBGOUPRS

| Instrument Group | Pretest Mean | Pretest S.D. | Posttest Mean | Posttest S.D. | d | t |
|---|---|---|---|---|---|---|
| PBI | | | | | | |
| Negro | 140.4 | 15.6 | 138.7 | 12.1 | -1.7 | -0.71 |
| White | 144.4 | 22.4 | 143.6 | 18.5 | -0.8 | -0.24 |
| TPI | | | | | | |
| Negro | 164.9 | 16.8 | 168.7 | 16.4 | 3.8 | 1.32 |
| White | 177.1 | 19.5 | 176.9 | 23.9 | -0.1 | -0.05 |
| D Scale | | | | | | |
| Negro | 140.4 | 31.9 | 130.3 | 25.4 | -10.1 | -2.32[a] |
| White | 160.4 | 22.2 | 155.7 | 20.1 | -4.7 | -1.06 |
| TPOR | | | | | | |
| Negro | 79.2 | 25.8 | 77.8 | 29.4 | -1.4 | -0.36 |
| White | 96.4 | 24.6 | 105.8 | 28.4 | 9.4 | 1.17 |

[a] $p < .05$

TABLE III

COMPARISON OF POSTTEST MEANS FOR SOUTH FLORIDA SUBGROUPS

| Instrument | Negro Mean | Negro S.D. | White Mean | White S.D. | d | t |
|---|---|---|---|---|---|---|
| PBI | 138.7 | 12.1 | 143.6 | 18.5 | 4.9 | 1.12 |
| TPI | 168.7 | 16.4 | 176.9 | 23.9 | 8.2 | 1.44 |
| D Scale | 130.3 | 25.4 | 155.7 | 20.1 | 25.4 | 3.40[a] |
| TPOR | 77.8 | 29.4 | 105.8 | 28.4 | 28.0 | 3.10[a] |

[a] $p < .01$

regression models were used to try to predict the change in TPOR scores. The initial model had only six variables--the averages of the pretest and posttest scores on the PBI, TPI, and D Scale and the differences in each case between the first and second administrations of the same instruments. These variables were found to contribute 7 per cent of the information necessary to predict the variation in TPOR scores. The second linear regression added the observers as dummy variables, and $R^2$ increased to 34 per cent. Despite the fact that the addition of the observers added 27 per cent to the information contributed by the equation, the F value was still nonsignificant.

The last three models were quadratic equations, allowing for a curvilinear relationship. The third model, with thirty-five variables, excluded the observers, using instead model one plus the average of the two TPOR scores, and the squares and interactions of these variables. Although this increased $R^2$ to 60 per cent, the F value decreased. Model four added the race of the observee, which added 1 per cent. Model five added the observers to model four, which produced an $R^2$ of 84 per cent and pushed F to 2.11, which is barely significant at the .05 level of confidence. These regressions are summarized in Table IV.

The fact that it took a forty-three variable model, which accounted for 84 per cent of the variation in the differences between first and second scorings of the TPOR, to produce a statistically significant F ratio points up the failure to identify any highly significant variables in the situation. However, the only two F ratios of substantial size were associated with models two and five, the only two equations which included the observers.

TABLE IV

MULTIPLE REGRESSION EQUATIONS USED TO PREDICT CHANGES IN TPOR SCORES

| Model | Number of Variables | Regression Type | $R^2$ | $F^a$ | df $m_1$ | df $m_2$ | $F^b$ |
|---|---|---|---|---|---|---|---|
| 1 | 6 | linear | 0.07 | 0.72 | 6 | 54 | |
| 2 | 13 | linear | 0.34 | 1.90 | 13 | 47 | 2.22[c] |
| 3 | 35 | quadratic | 0.60 | 1.06 | 35 | 25 | 0.71 |
| 4 | 36 | quadratic | 0.61 | 1.04 | 36 | 24 | 0.80 |
| 5 | 43 | quadratic | 0.84 | 2.11[c] | 43 | 17 | 3.58[c] |

[a]This is the F ratio of the mean squares for the regression and for error within a given model.

[b]This is the F ratio resulting from a test of significance of the $R^2$ of two multiple regression equations. Each value in this column represents the difference in $R^2$ for the model in that row and the one immediately above it. Thus models two and five made statistically significant contributions over models one and four, respectively. For a discussion of this test, see J. P. Guilford, *Fundamental Statistics in Psychology and Education* (fourth edition; New York: McGraw-Hill Book Company, 1965), p. 403.

[c]$p<.05$

And in both cases the inclusion of the observers increased $R^2$ to the point that model two made a significant increase in information over model one and model five over model four. Table IV also includes the F values for the difference between $R^2$ of succeeding equations. The two significant increases imply that the block of dummy observer variables was the principal contributor identified. A comparison of the $R^2$ of model three with model one yields an F of 1.12, the nonsignificance of which substantiates the importance of the observer variables.

*Ratio changes.* Inasmuch as there were no significant changes in any of the component scores which form the ratios, the lack of a significant change in any ratio mean was no surprise. Only in the case of the white subgroup's TPOR'/TPI' ratio was there increased consistency. In every other instance the posttest ratio mean was further removed from 1.000 than the pretest ratio mean. However, in no instance did a group become significantly less consistent. Table V summarizes the results of this analysis.

Although there were no significant changes within a subgroup on any ratio, there were such changes between subgroups. The pretest mean ratios for the subgroups were not significantly different; however, Table VI shows that at the end of the in-service program the Negro and white teachers differed significantly on the mean TPOR'/PBI' and TPOR'/TPI' ratios. The TPOR means were significantly different at the .05 level of confidence before the in-service program, and this difference increased substantially (to the .01 level of confidence) on the posttest. Both the TPOR'/PBI' and the TPOR'/TPI' ratios reflect this change. The reservations about the

TABLE V

t-VALUES FOR PAIRED DIFFERENCE OF PRETEST AND POSTTEST RATIOS FOR SUBGROUPS

| Instruments Group | Mean Ratios Pretest | Posttest | d | t |
|---|---|---|---|---|
| PBI/TPI | | | | |
| Negro | 0.858 | 0.830 | -0.028 | -1.44 |
| White | 0.817 | 0.814 | -0.003 | -0.11 |
| TPOR'/PBI' | | | | |
| Negro | 0.870 | 0.861 | -0.009 | -0.19 |
| White | 1.047 | 1.119 | 0.072 | 0.66 |
| TPOR'/TPI' | | | | |
| Negro | 0.690 | 0.657 | -0.033 | -0.77 |
| White | 0.767 | 0.844 | 0.077 | 1.23 |

TABLE VI

COMPARISON OF RATIO MEANS OF
NEGRO AND WHITE SUBGROUPS

| Instruments Order | Negro Mean | Negro S.D. | White Mean | White S.D. | t |
|---|---|---|---|---|---|
| PBI/TPI | | | | | |
| Pretest | 0.585 | 0.111 | 0.817 | 0.102 | -1.13 |
| Posttest | 0.830 | 0.104 | 0.814 | 0.082 | -0.58 |
| TPOR'/PBI' | | | | | |
| Pretest | 0.870 | 0.314 | 1.047 | 0.405 | 1.49 |
| Posttest | 0.861 | 0.334 | 1.119 | 0.309 | 2.62[a] |
| TPOR'/TPI' | | | | | |
| Pretest | 0.690 | 0.221 | 0.767 | 0.210 | 1.16 |
| Posttest | 0.657 | 0.244 | 0.844 | 0.235 | 2.53[a] |

[a] $p<.05$

difficulty of obtaining reliable TPOR scores have already been discussed; however, it should be noted that these reservations apply also to ratios which utilized the TPOR scores.

The Negro teachers were significantly more dogmatic than the white teachers at the beginning of the program, and they became significantly more dogmatic during the program, preserving the significant difference between the two subgroups on the pretest. However, the regression models did not show the D Scale to be a significant information contributor to the change in TPOR scores. For the Negro subgroup there was a significant ($p<.01$) negative correlation ($r = -.52$) between the initial D Scale score and any change on the D Scale during the in-service program, which would imply that the more dogmatic a Negro teacher was at the beginning of the in-service program, the greater his increase in dogmatism. There was no such significant correlation for the white subgroup.

*Personal Threat and Dogmatism*

Once the in-service program began, it became obvious to the observers and the consultant that many of the Negro teachers were feeling extremely threatened by the whole enterprise. Investigation revealed that the schools of the county were to be integrated the following year, and many Negroes interpreted the sudden interest of white educators in them and in their beliefs and teaching practices as an evaluation process designed to determine which Negro teachers to transfer to formerly white schools and which to replace with "superior" white teachers. This becomes more credible when one recognizes that segregation in this rural, south Florida county was so

complete that only white people lived in the only town of any size, and many Negro children were bused across the county--past several white schools--to an appropriate Negro school! The 14 white participants in the in-service program were specially selected representatives of the white schools which were soon to be integrated; they were there solely to smooth the way to peaceful integration.

The team of observers--all of whom were white--reported that they were met with hostility in many Negro classrooms. In order that they might be as well-prepared as they wished, the teachers were told when they would be observed at least a day in advance. In one instance the observer waited almost two hours in the classroom with the pupils while the teacher made herself unavailable. In another instance a teacher refused to make an appointment for the following day because she planned to be ill. In several instances the teacher would teach in the presence of the observer only after personal assurances from the observer that the observation was not part of a county-wide evaluation of Negro teachers.

Despite the fact that many of these people perceived the in-service program and/or the data collection procedures of this research as a direct personal threat related to the integration of the schools, it is impossible to know the exact effect that this had upon the subjects of this study. It is possible that generations of segregation, with the cultural and financial poverty and limited education which accompanied it, have produced a Negro subculture in this area that is significantly more dogmatic than the dominant white culture. It is also possible that generations of unequal treatment by

society has created a Negro subculture that has learned to exist by avoiding contact with white authority whenever possible and that becomes very threatened when such contact is forced upon it.

Unfortunately there is no way to know what the findings of this research would have been if the threat of integration had not been there and/or if the consultant and observers had been Negroes. Nor is there a way to know if these same Negro teachers would have been more open to change in another situation.

However, there was a second kind of personal threat which both the Negro and white teachers were exposed to: the experience of being confronted with evidence which showed them to be inconsistent and to be guilty of teaching behavior of which they did not approve. The in-service program had this as its function, to see if teachers could be stimulated to behave as they believed. However, the Negro subgroups, already threatened by impending integration and possible loss of jobs and already significantly more closed to change than the white teachers, reacted to this new trauma by resisting a perception of themselves which they could not assimilate and which they ultimately rejectdd. They became even more dogmatic.

The white teachers, seeing that they were as inconsistent as the Negro teachers, reacted by widening the TPOR behavioral gap between themselves and the Negro teachers from 17.2 points on the pretest to 28.0 points on the posttest. As Tables I and III show, the pretest difference was significant at the .05 level of confidence, but the posttest level was .01. This was possible because they were not immobilized by their dogmatism.

*Conclusions*

All three research questions originally proposed received negative answers on the basis of this data. The only significant change was in dogmatism, and there were no significant increases or decreases in consistency. No significant predictors of change in teaching behavior were found. Although the division of an already small sample into two smaller subsamples and the association of the research with impending integration certainly limit the generalizability of the findings, certain trends in the data may be pointed out, if only tentatively.

Empirical evidence of personal inconsistency seemed to promote greater consistency only in those instances in which the inconsistency was associated with some very personal threat that could be eliminated by changed beliefs and behavior, especially the latter. The white teachers who had come to help the Negro teachers were compared with them, and this anxiety-producing similarity stimulated a substantial change in behavior away from the Negro subgroup. The latter subgroup had no apparent way to remove the tension they felt.

The reaction of teachers to empirical evidence of personal inconsistency seemed to be a function of their openness to change. If they were not immobilized by dogmatism, if the knowledge of inconsistency posed a personal threat, they seemed to change at the points of greatest personal tension. However, people who were not open to change seemed to retreat from the evidence and draw themselves into a shell of increased resistance to change of any sort.